Ohio Department of Health

Health Assessment Section

Bureau of Environmental Health and Radiation Protection

Advancing the health and well-being of all Ohioans.

Vinyl Chloride

Answers to Frequently Asked Questions

What is vinyl chloride?

Vinyl chloride (vi-null klor-ide) is a gas at room temperature that burns easily. At very cold temperatures, vinyl chloride becomes a liquid, but it evaporates (changes from a liquid to a gas) easily. Large amounts of vinyl chloride can have a mild, sweet smell.

Vinyl chloride is a manmade chemical that is not found in nature. Almost all vinyl chloride is used to make a type of plastic called PVC, which is used in pipes, wire and cable coatings, car parts, housewares, and packing materials.

Image source: iStock

How does vinyl chloride enter the environment?

Vinyl chloride is released into the air and water by factories that produce or use vinyl chloride.

Vinyl chloride is also created when microorganisms (tiny living creatures) in soil and water break down other chemicals, like PCE and TCE, and turn them into vinyl chloride. This is the most common source of vinyl chloride in Ohio.

Once it is in the environment, vinyl chloride is broken down by sunlight in a few days and changed into other chemicals, like formaldehyde. Most vinyl chloride that is spilled in soil or surface water (like lakes, ponds, and rivers) evaporates into the air quickly. Some vinyl chloride can travel into groundwater (underground sources of water) where it will be broken down over time.

How can vinyl chloride enter my body?

Because vinyl chloride is a gas at room temperature, the most likely way it will enter a person's body is by breathing it in.

You can also drink vinyl chloride in contaminated (polluted) drinking water. Faucets that use PVC pipe probably do not add vinyl chloride to the drinking water.

If vinyl chloride touches your skin or gets into your eyes, a small amount may pass into your body.

Vinyl chloride will travel through your body in your blood. Your liver will break it down into other chemicals, some of which can be more harmful than the vinyl chloride itself. Some of these new chemicals can be stored in your body for a long time.

Eventually, most vinyl chloride will leave your body through your urine or breath.

Can vinyl chloride cause health effects?

Breathing and drinking vinyl chloride can cause health problems. Whether you get sick from vinyl chloride depends on:

- How much you were exposed to (dose).
- How long you were exposed (duration).
- How often you were exposed (frequency).
- General health, age, and lifestyle.

People who live near or work in factories that use and produce vinyl chloride will probably have the most exposure to vinyl chloride. People who live near landfills or toxic waste sites that leak vinyl chloride into their homes may also have higher exposure.

What health problems does vinyl chloride cause?

Breathing high levels of vinyl chloride can make you dizzy or sleepy, or have a headache. If you do not get fresh air, you may pass out. You can die from breathing extremely high levels of vinyl chloride.

People who breathe vinyl chloride gas over many years may have liver damage. These people may also have nerve damage and can develop immune system problems which makes them unable to fight off illnesses.

In jobs where there are high levels of vinyl chloride, workers may have blood flow problems in their hands and fingers. This can cause skin changes in the hands and arms, and it can damage the bones in the fingers. Some men who work in jobs like this complain of a lower sex drive. Some women who work in jobs like this complain of irregular periods and develop high blood pressure during pregnancy.

Does vinyl chloride cause cancer?

Yes. The International Agency for Research on Cancer (IARC) lists vinyl chloride as carcinogenic to humans, meaning they have enough scientific proof to know that it causes cancer in people.

People who are often exposed to vinyl chloride for a long time, especially workers who use it for their job, are more likely to get liver cancer. Vinyl chloride may also cause brain cancer, lung cancer, and some types of blood cancer.

How does vinyl chloride affect children?

Babies and children who breathe or drink vinyl chloride can have the same health effects as adults. There is not enough scientific proof at this time to show whether vinyl chloride causes birth defects in humans.

Studies that used laboratory animals showed that when pregnant mother animals breathed in vinyl chloride, the baby animal was born underweight and had bone development problems. Animal studies also showed that baby animals are more likely to get cancer from vinyl chloride than adult animals. Scientists are not sure if this information is also true for humans.

Is there a medical test to show if I have been exposed to vinyl chloride?

There are tests that can measure vinyl chloride in your blood, breath, urine, and tissue (samples of skin and organs), but these tests are not available at most doctors' offices. Some of these tests are not useful for measuring low levels.
These tests may show if you have been exposed to vinyl chloride, but they cannot tell you if you will be sick or where the vinyl chloride came from.

What is the federal government doing to protect me from vinyl chloride?

The federal government develops regulations and recommendations to protect the public from the harmful effects of vinyl chloride. Regulations can be required by law. Guidelines are set for:

- Drinking water. The U.S. Environmental Protection Agency (EPA) sets a limit of 0.002 milligrams of vinyl chloride for every 1 liter of water (0.002 mg/L). Or, in other words, if you had 1 billion parts drinking water, only 2 parts could be vinyl chloride (2 ppb).
- Food. The Food and Drug Administration (FDA) regulates vinyl chloride in plastic food containers.
- Workplace air. The Occupational Safety and Health Administration (OSHA) does not allow any employee to be exposed to more than 1 part vinyl chloride to every 1 million parts air over an 8-hour work day.

Resources

Agency for Toxic Substances and Disease Registry (ATSDR). 2006. Toxicological profile for vinyl chloride. Atlanta, GA. U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

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